

violence, and temperatures uniformly below the normal. Frosts occurred on the 26-27th in some of the northern sections and snow flurries were reported in some of the mountain regions of New Hampshire. High winds prevailed along the coast on the 18th and 19th, for which warnings were issued. There was no damage to shipping, so far as known to this office. No storms occurred without warnings.—*J. W. Smith, District Forecaster.*

#### NEW ORLEANS FORECAST DISTRICT.

The month of July was mild and no extensive storm occurred. The month opened with rainy weather in some parts of the district, especially over Texas, and showers continued until the 9th, after which dry weather prevailed, except for occasional scattered showers, until the 25th, when rainy weather set in over Louisiana and Texas and continued until the close of the month. The commencement of these rains, following two weeks' dry weather, was announced in the forecasts of the 24th, practically twenty-four hours before the rains set in. Excessive local rains occurred in Texas on the 29th and 30th.—*I. W. Cline, District Forecaster.*

#### CHICAGO FORECAST DISTRICT.

Except for squalls, which usually attend summer thunderstorms, there was but one storm of any severity which crossed the district during the month. This storm developed in the Southwest during the night of the 16th and passed across the Lakes during the 17th and 18th, causing destructive winds and doing damage. Warnings were issued well in advance and shipping interests cautioned. During the passage of this disturbance severe local storms with tornadic characteristics occurred in portions of Illinois. A severe hailstorm occurred in Chicago and vicinity on the 21st. This storm was unusual both in duration—lasting five minutes—and in the size of the hailstones, some of the stones measuring an inch in diameter, with jagged points.—*F. J. Walz, Inspector, Weather Bureau.*

#### SAN FRANCISCO FORECAST DISTRICT.

The month as a whole has been an uneventful one. Cooler weather than usual prevailed throughout California, permitting fruit to ripen slowly. From July 12 to 17 and again from the 20th to 24th generous rains and frequent thunderstorms occurred from the Valley of the Colorado eastward. Warnings of warmer weather with high north winds were issued for northern California on July 2, and were verified.—*A. G. McAdie, Professor of Meteorology.*

#### PORTLAND, OREG., FORECAST DISTRICT.

The first decade of the month in this district was unsettled and showery, and the month, as a whole, averaged from 1° to 3° cooler than usual. A light frost occurred in southwestern Idaho on the morning of the 3d, for which warnings were issued twenty-four hours in advance.

The Columbia River slowly fell during the entire month, and at Portland, Oreg., the river passed below the danger mark during the afternoon of the 14th. It was forty-one days above danger line, during fifteen days of which time it was rising; on two days it was stationary, and during the remainder of the period it was falling.—*E. A. Beals, District Forecaster.*

#### DENVER FORECAST DISTRICT.

No special warnings were issued. The feature of the month was the exceptionally cool weather that prevailed following the passage of a low barometer area that developed in the middle Rocky Mountain region during the afternoon of July 1. During the 3d the fall in temperature was sharp, with a general and killing frost in high agriculture districts, and light local

frosts at moderate elevations on the 3d and 4th. Cooler weather was forecast for almost the entire district on the mornings of the 2d and 3d.—*F. H. Brandenburg, District Forecaster.*

#### AREAS OF HIGH AND LOW PRESSURE.

*Movements of centers of areas of high and low pressure.*

Number.	First observed.			Last observed.			Path.		Average velocity.	
	Date.	Lat. N.	Long. W.	Date.	Lat. N.	Long. W.	Length.	Duration.	Daily.	Hourly.
<b>High areas.</b>										
I.....	1, a. m.	41	124	3, a. m.	47	122	525	2.0	262	10.9
II.....	3, p. m.	49	86	6, a. m.	32	65	1,675	2.5	670	28.0
III.....	3, p. m.	47	112	10, a. m.	27	80	3,800	6.5	585	24.4
IV.....	6, p. m.	41	124	8, a. m.	45	100	1,375	1.5	917	38.2
V.....	8, p. m.	45	123	18, a. m.	32	65	4,150	9.5	437	18.2
VI.....	16, a. m.	53	121	21, p. m.	37	81	3,600	5.5	654	27.2
VII.....	22, a. m.	47	92	25, p. m.	38	80	1,400	3.5	400	16.7
VIII.....	24, p. m.	53	105	28, a. m.	39	75	2,000	3.5	571	23.8
IX.....	28, a. m.	48	117	4, a. m.*	45	64	3,575	7.0	511	21.3
Sums.....							22,100	41.5	5,007	208.7
Mean of 9 paths.....							2,456		556	23.2
Mean of 41.5 days.....									532	22.2
<b>Low areas.</b>										
I.....	29, p. m.†	38	105	2, p. m.	46	60	2,475	3.0	825	34.4
II.....	30, p. m.†	50	120	3, p. m.	50	100	2,225	3.0	742	30.9
III.....	2, p. m.	35	112	6, a. m.	44	70	2,550	3.5	728	30.3
IV.....	4, p. m.	44	116	8, a. m.	48	89	1,750	3.5	500	20.0
V.....	15, a. m.	35	112	19, a. m.	41	70	2,500	4.0	625	26.8
VI.....	21, a. m.	48	89	24, a. m.	46	60	1,700	3.0	567	23.6
VII.....	25, p. m.	44	116	30, p. m.	48	68	2,750	5.0	550	22.9
Sums.....							15,950	25.0	4,537	188.9
Mean of 7 paths.....							2,278		648	27.0
Mean of 25.0 days.....									638	26.6

\* August. † June.

For graphic presentation of the movements of these highs and lows see Charts I and II.—*George E. Hunt, Chief Clerk, Forecast Division.*

#### RIVERS AND FLOODS.

Nothing of special interest transpired in the various river districts during the month. As a rule the stages were lower than during the preceding month. In the interior districts, however, they were higher than the usual summer stages, as a result both of the substantial rainfall and of the fact that the flood waters of May and June had not entirely passed out.

In the upper Red River there was a period of comparatively high water from the 4th to the 7th, with danger line stages at Arthur City, Tex., and Fulton, Ark. Warnings that were telegraphed on the morning of the 4th to all available points within the State of Arkansas were well verified by the subsequent events. Some losses to crops were reported, amounting to perhaps \$15,000 or \$20,000, while the value of property saved by removal or protection was, according to advices received, about \$200,000.

Heavy local showers over Texas during the first few days of the month also caused a sharp rise in the Trinity River. At Dallas, Tex., the water rose from 7.9 feet on the 2d to 32.7 feet on the 6th, the latter stage being 7.7 feet above the danger line. At points below the rise was not so marked. Warnings were distributed on the morning of the 4th, but four days after the establishment of the service on Trinity River. This new service is a part of the extensive additions that were made to the Texas River and Flood Service on July 1, 1903. Heretofore, service had been maintained only on the Brazos River, but on July 1 new river stations were established as follows: On the Sabine River, at Logansport, La., and Orange, Tex.; on the Neches River, at Rockland and Beaumont, Tex.; on the Trinity River, at Dallas, Riverside, and Liberty, Tex., and on the Colorado River, at Ballinger, Austin, and Colum-